Fake Jets Due to Pileup

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It can be seen that the shape of the distribution 'Number of jets vs.ETAjet' for jets reconstructed in presence of pile-up become differ from such distribution for generated jets beginning from Et>30GeV.(jet_1.ps). More clear it is shown in jet_2.ps, here these distributions are plottedfor two ranges of Et: a) 40GeV>Etjet>30GeV, 40GeV>Etgenjet>30GeV b)50GeV>Etjet>40GeV, 50GeV>Etgenjet>40GeV. The shape of the distribution ofjets reconstructed in events without pile-up is very similar to the shapeof distribution of generated jets. I think It shows that additional jet-sare due to low Et particles, which are bent in magnetic filed and cometo |eta| about 3-4 instead of the central region. It seems to me that itis very important to understand the structure of these jets. For example if they really come from soft particles they can have low Et values ofindividual cells inside jet. It can be used to reduce the number of suchjets. If you are interested in this work please write me.

I search for jets with radius R = 0.7

list of figures:

jet_1.ps: here hlt170230 was taken, 500 events with pile-up and 500 without pile-up were read.

a) here tree distributions are superimposed : 1.'Number of reconstructed jets vs. ETAjet', Etjet>90GeV in presence of pile-up, 2.'Number of reconstructed jets vs. ETAjet', Etjet>90GeV, without pile-up, 3.'Number of generated jets vs. ETAgenjet', Etgenjet>90GeV

b) the same plots as in a) but Etjet>80GeV, Etgenjet>80GeV
c) the same plots as in a) but Etjet>70GeV, Etgenjet>70GeV
d) the same plots as in a) but Etjet>60GeV, Etgenjet>60GeV

jet_2.ps: hlt170230, 500 events with pile-up and 500 without pile-up

a) the same plots as in jet_1.ps a) but Etjet>50GeV, Etgenjet>50GeV
b) the same plots as in jet_1.ps a) but Etjet>40GeV, Etgenjet>40GeV
c) the same plots as in jet_1.ps a) but Etjet>30GeV, Etgenjet>30GeV
d) the same plots as in jet_1.ps a) but Etjet>20GeV, Etgenjet>20GeV

jet_3.ps: hlt170230, 500 events with pile-up and 500 without pile-up

a) the same plots as in jet_1.ps a) but 40GeV>Etjet>30GeV, 40GeV>Etgenjet>30GeV
b) the same plots as in jet_1.ps a) but 50GeV>Etjet>40GeV, 50GeV>Etgenjet>40GeV
c)'Number of rec. jets vs. Etjet',with pile-up; 'Number of rec. jets vs. Etjet',without pile-up; 'Number of generated jets vs. Etgenjet'

jet_4.ps: hlt120170, 500 events with pile-up and 500 without pile-up

a) the same as jet_1.ps a) but Etget>50GeV, Etgenjet>50GeV, and hlt120170!
b) the same as jet_1.ps a) but Etget>40GeV, Etgenjet>40GeV, and hlt120170!
c) the same as jet_1.ps a) but Etget>30GeV, Etgenjet>30GeV, and hlt120170!
d) the same as jet_1.ps a) but Etget>20GeV, Etgenjet>20GeV, and hlt120170!

jet_5.ps: hlt120170, 500 events with pile-up and 500 without pile-up

a) the same plots as in jet_1.ps a) but 40GeV>Etjet>30GeV, 40GeV>Etgenjet>30GeV, hlt120170
b) the same plots as in jet_1.ps a) but 50GeV>Etjet>40GeV, 50GeV>Etgenjet>40GeV, hlt120170
c)'Number of rec. jets vs. Etjet',with pile-up; 'Number of rec. jets vs. Etjet',without pile-up; 'Number of generated jets vs. Etgenjet'

jet_6.ps: hlt80120, 500 events with pile-up and 500 without pile-up

a) the same as jet_1.ps a) but Etget>50GeV, Etgenjet>50GeV, and hlt80120!
b) the same as jet_1.ps a) but Etget>40GeV, Etgenjet>40GeV, and hlt80120!
c) the same as jet_1.ps a) but Etget>30GeV, Etgenjet>30GeV, and hlt80120!
d) the same as jet_1.ps a) but Etget>20GeV, Etgenjet>20GeV, and hlt80120!

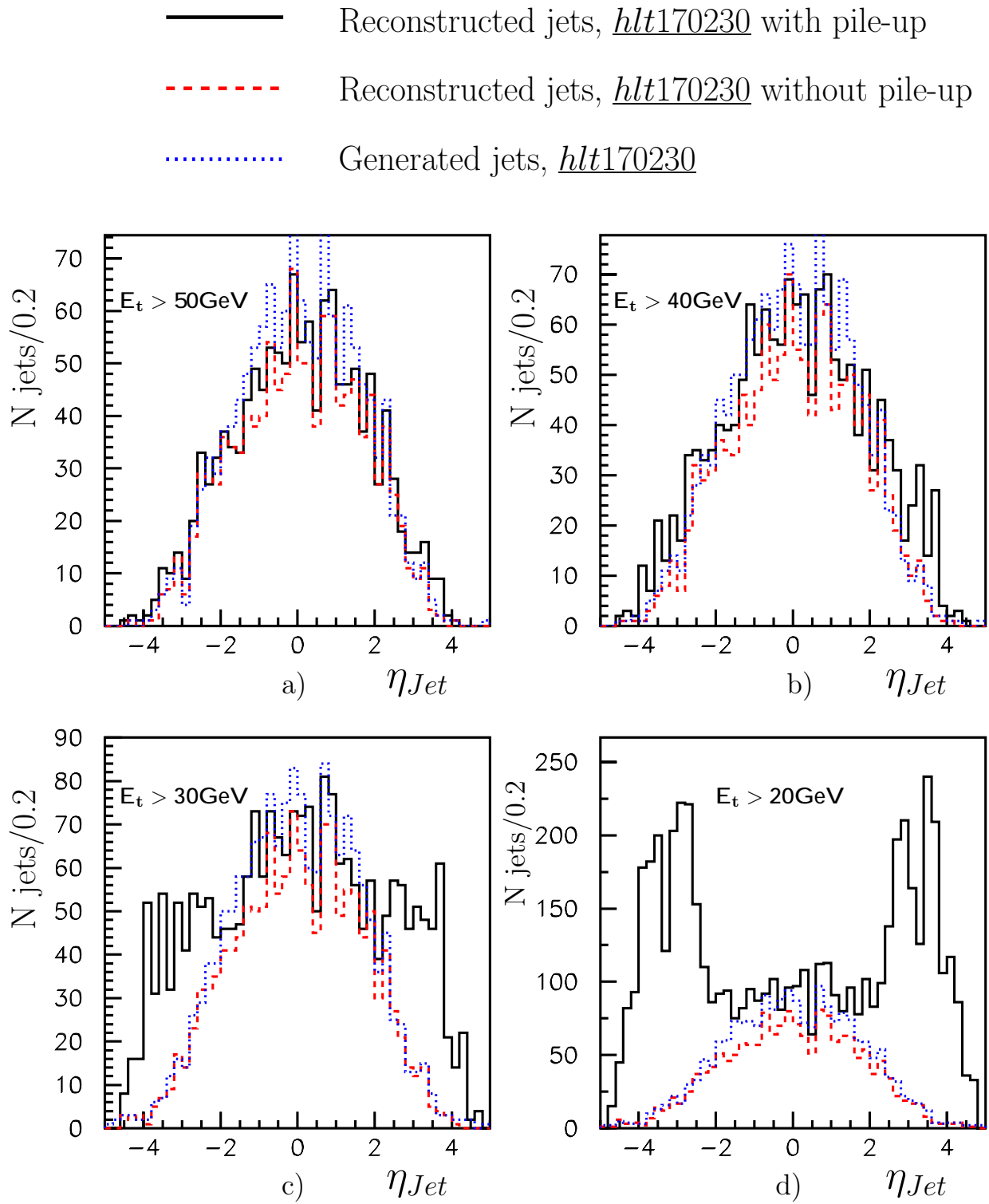jet_7.ps: hlt80120, 500 events with pile-up and 500 without pile-up

a) the same plots as in jet_1.ps a) but 40GeV>Etjet>30GeV, 40GeV>Etgenjet>30GeV, hlt80120
b) the same plots as in jet_1.ps a) but 50GeV>Etjet>40GeV, 50GeV>Etgenjet>40GeV, hlt80120
c)'Number of rec. jets vs. Etjet',with pile-up; 'Number of rec. jets vs. Etjet',without pile-up; 'Number of generated jets vs. Etgenjet'

Reconstructed jets, <u>hlt170230</u> with pile-up

Reconstructed jets, <u>hlt170230</u> without pile-up

Generated jets, <u>hlt170230</u>
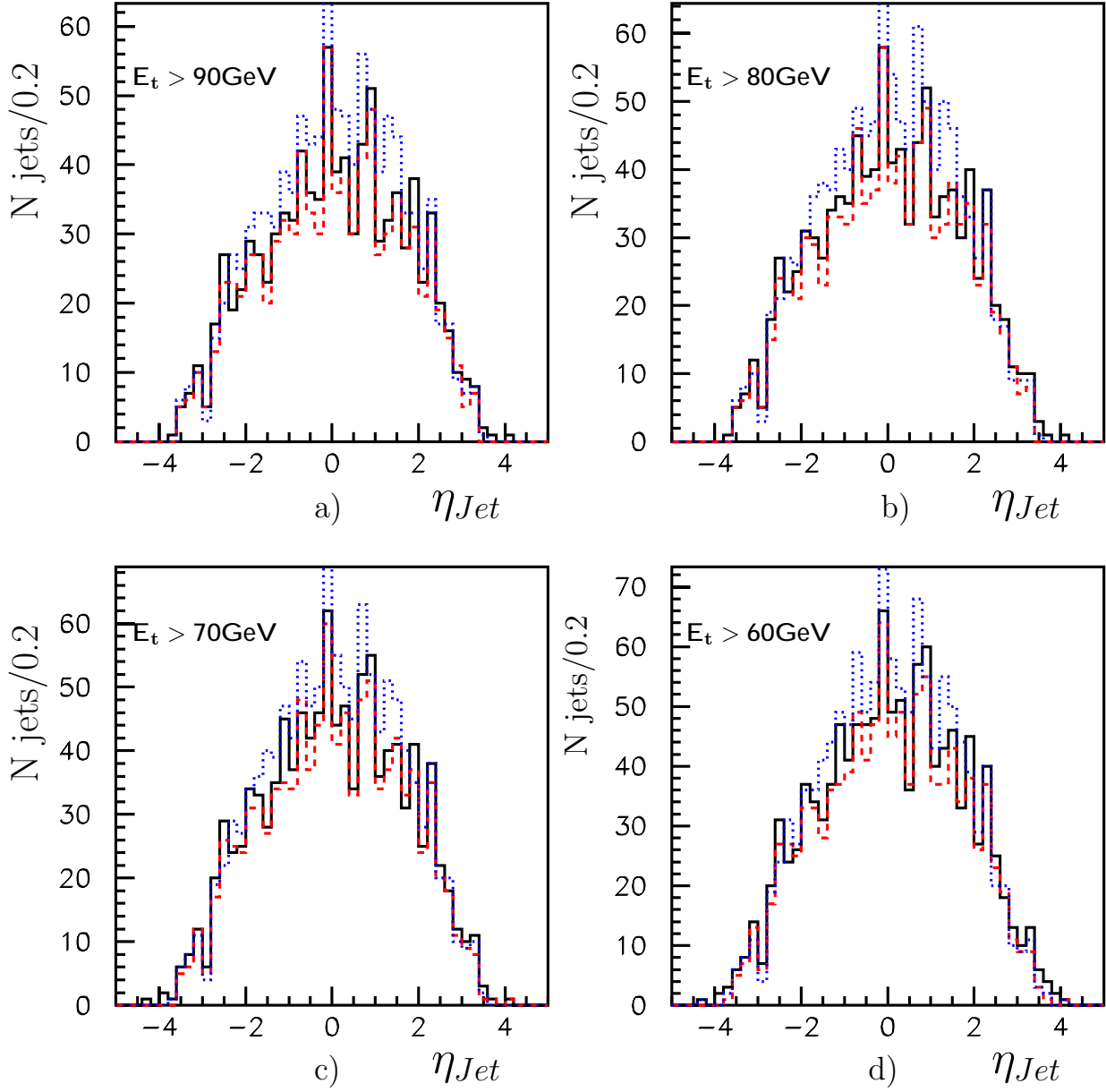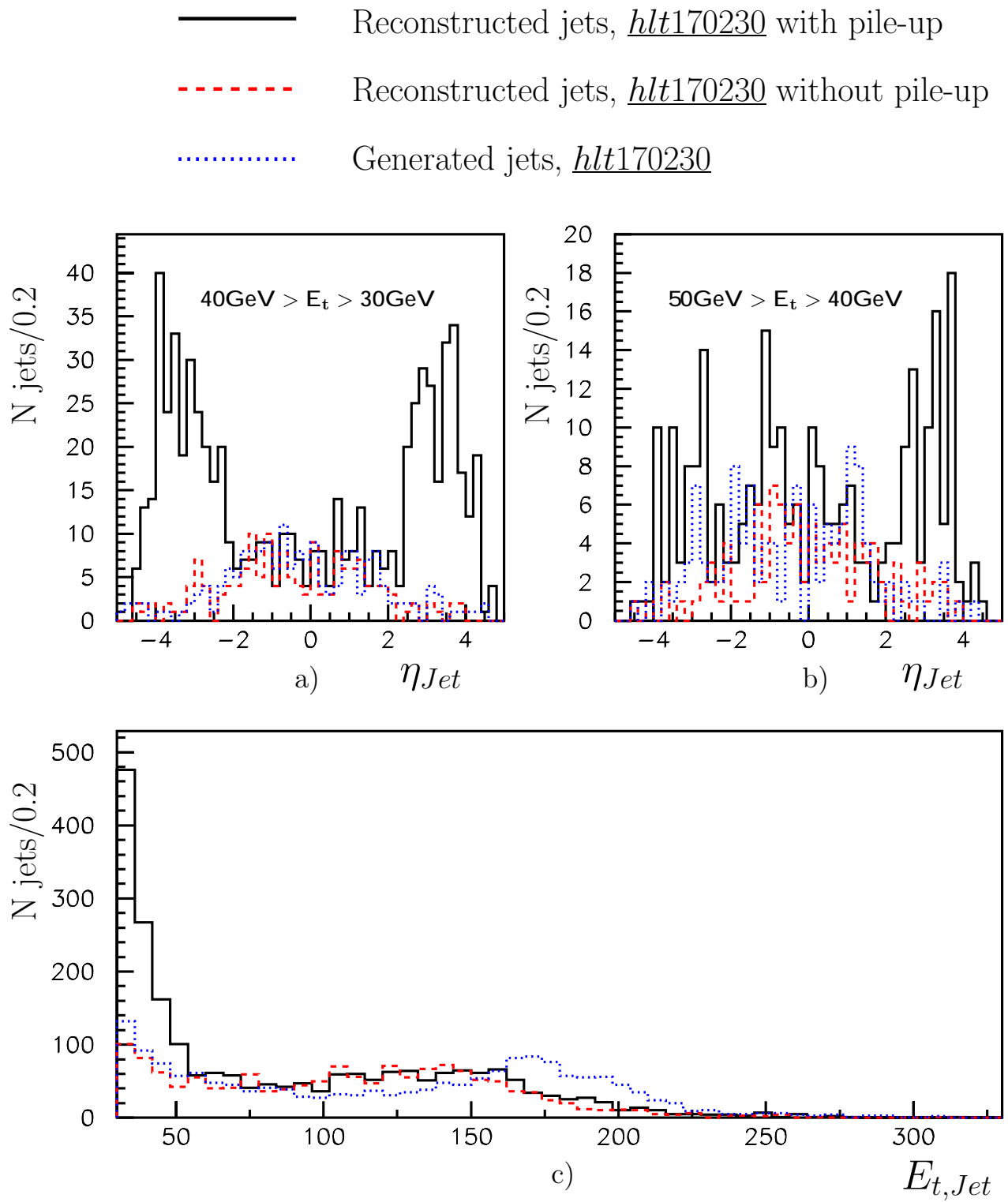
a) $E_{t,ReconstructedJets} > 90 GeV$, $E_{t,GeneratedJets} > 90 GeV$

b) $E_{t,ReconstructedJets} > 80 GeV$, $E_{t,GeneratedJets} > 80 GeV$

c) $E_{t,ReconstructedJets} > 70 GeV$, $E_{t,GeneratedJets} > 70 GeV$

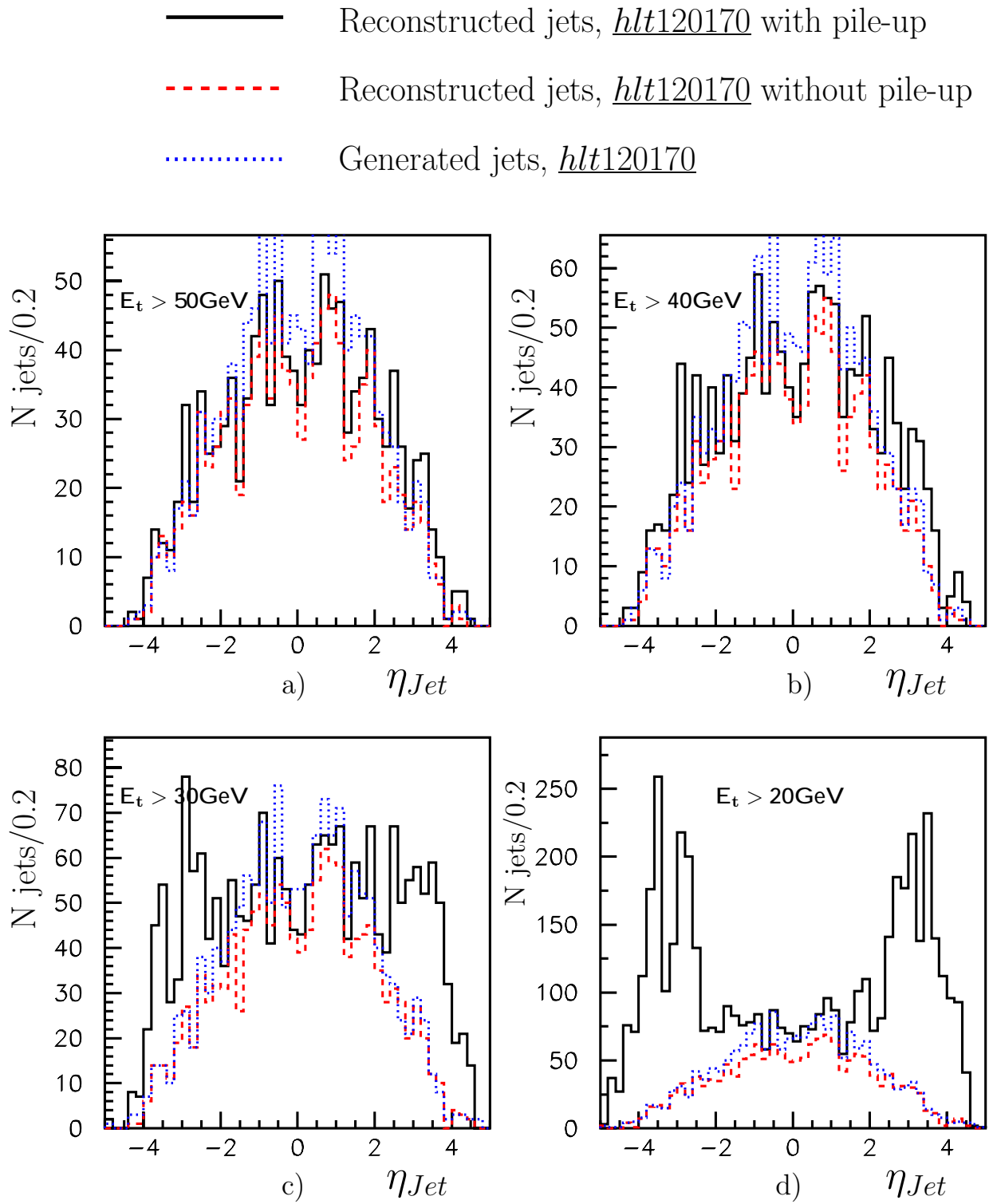d) $E_{t,ReconstructedJets} > 60 GeV$, $E_{t,GeneratedJets} > 60 GeV$

<u>Fig.1</u>

Fig.2

a) $E_{t,ReconstructedJets} > 50GeV$, $E_{t,GeneratedJets} > 50GeV$

b) $E_{t,ReconstructedJets} > 40GeV$, $E_{t,GeneratedJets} > 40GeV$

c) $E_{t,ReconstructedJets} > 30GeV$, $E_{t,GeneratedJets} > 30GeV$

d) $E_{t,ReconstructedJets} > 20GeV$, $E_{t,GeneratedJets} > 20GeV$

Reconstructed jets, _hlt_170230 with pile-up
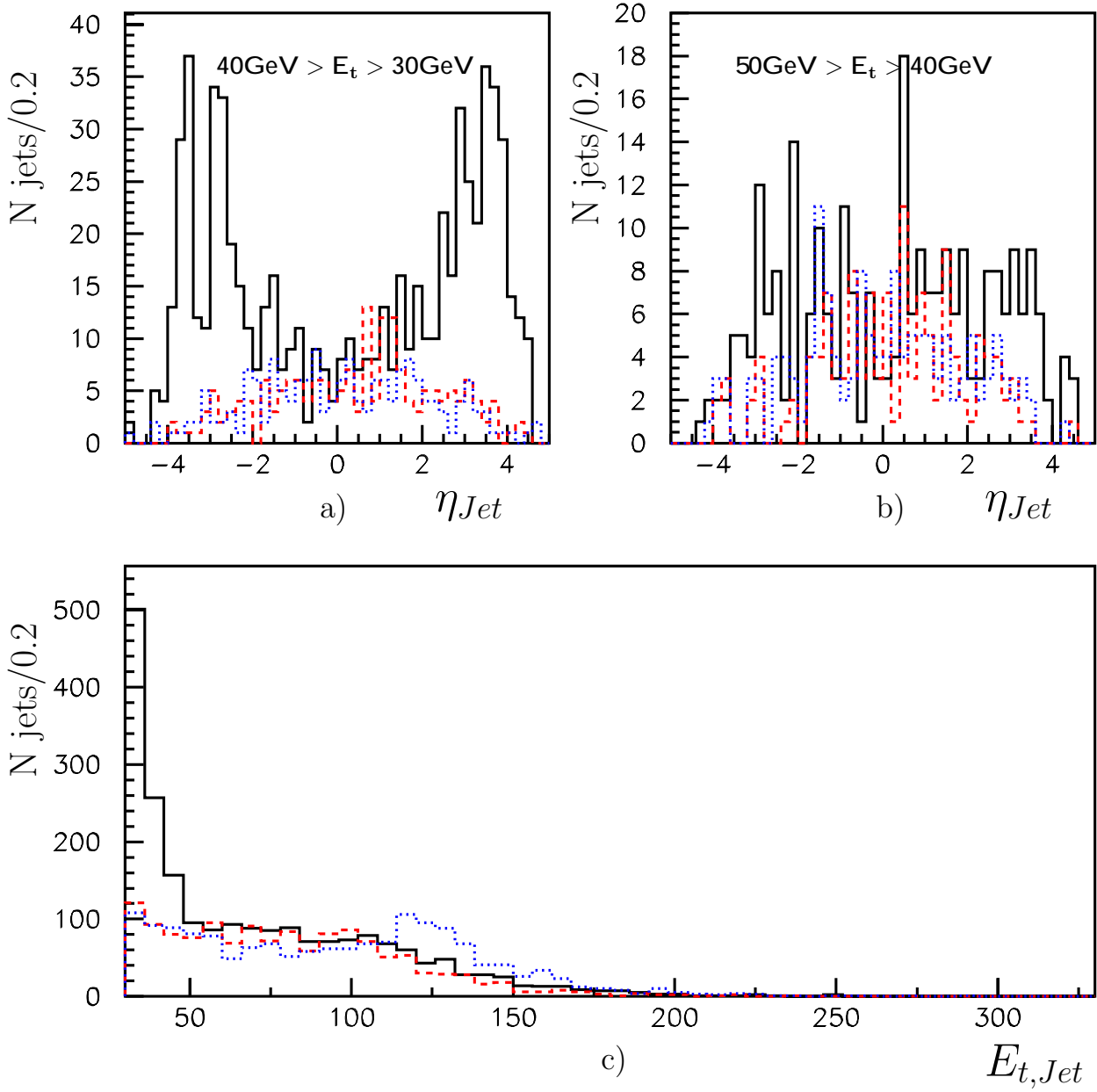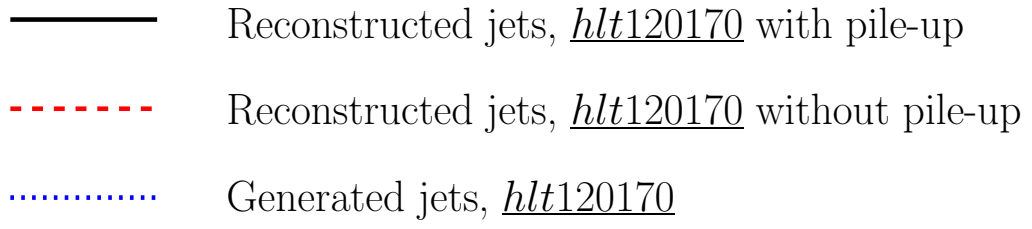
Reconstructed jets, _hlt_170230 without pile-up

Generated jets, _hlt_170230

a) $40GeV > E_{t,ReconstructedJets} > 30GeV$, $40GeV > E_{t,GeneratedJets} > 30GeV$

b) $40GeV > E_{t,ReconstructedJets} > 30GeV$, $40GeV > E_{t,GeneratedJets} > 30GeV$

c) $E_{t,ReconstructedJets} > 30GeV$, $E_{t,GeneratedJets} > 30GeV$

Fig.3

Fig.4

a) $E_{t,ReconstructedJets} > 50 GeV$, $E_{t,GeneratedJets} > 50 GeV$

b) $E_{t,ReconstructedJets} > 40 GeV$, $E_{t,GeneratedJets} > 40 GeV$

c) $E_{t,ReconstructedJets} > 30 GeV$, $E_{t,GeneratedJets} > 30 GeV$

d) $E_{t,ReconstructedJets} > 20 GeV$, $E_{t,GeneratedJets} > 20 GeV$

Reconstructed jets, *hlt*120170 with pile-up
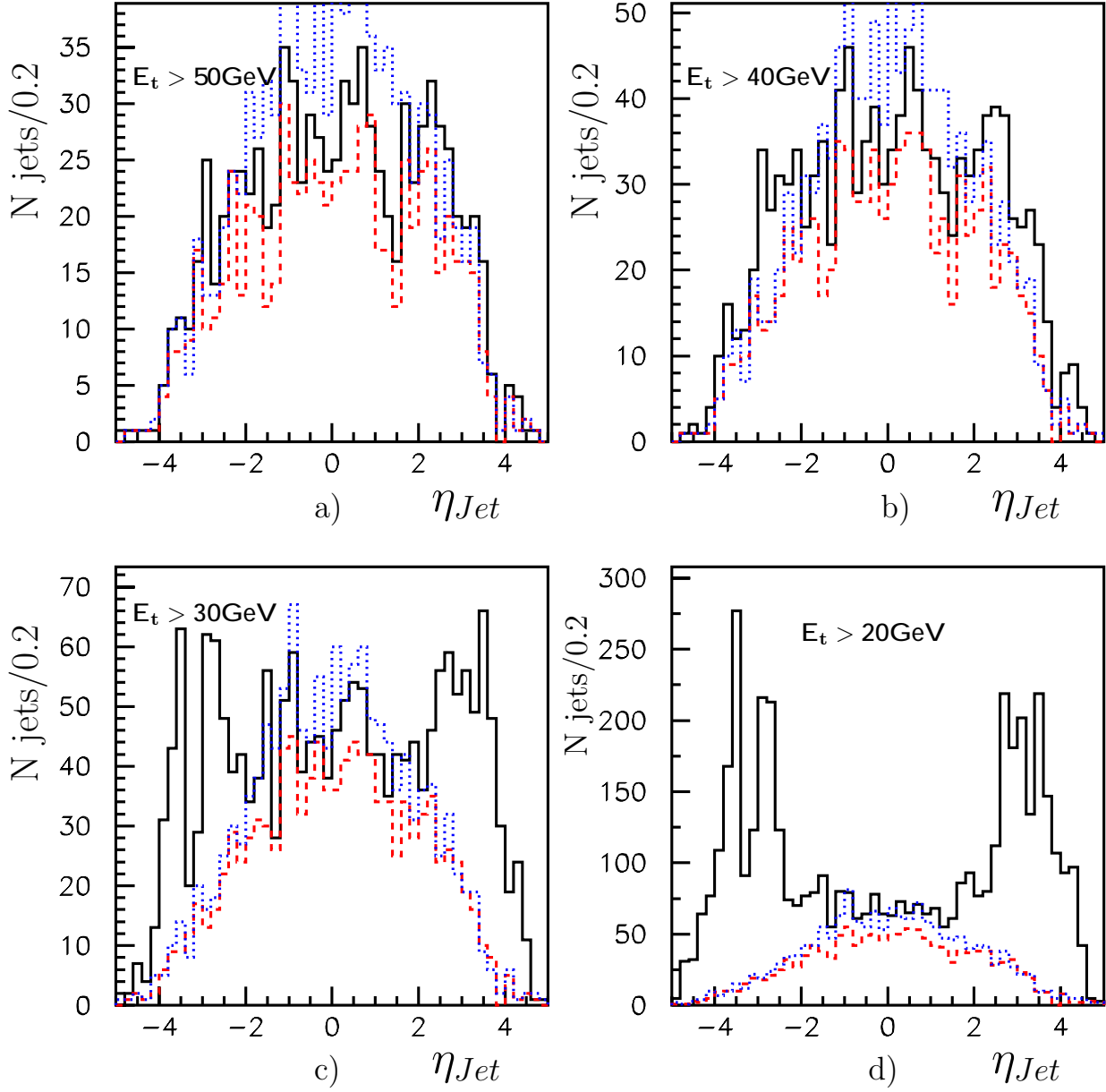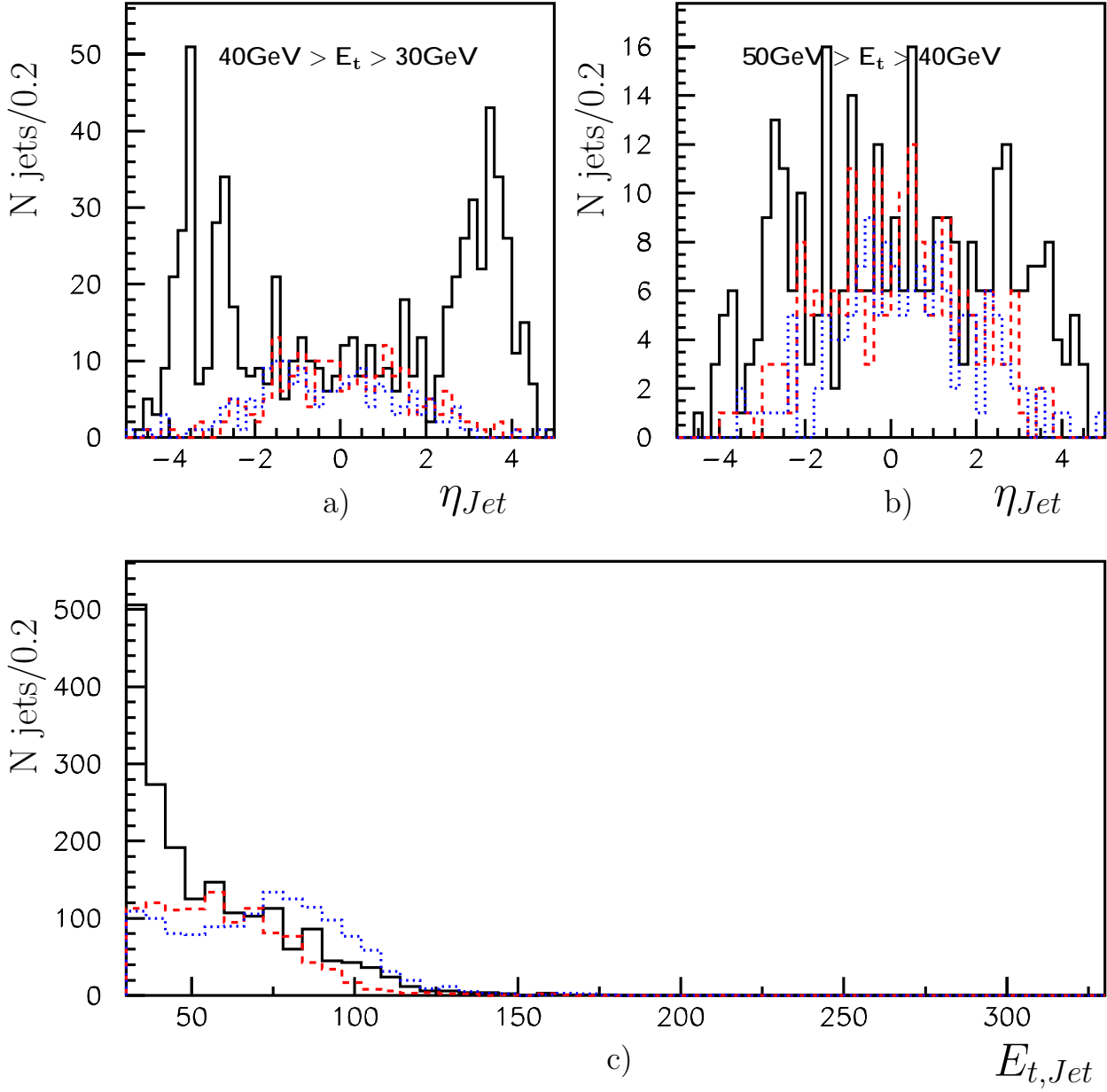
Reconstructed jets, *hlt*120170 without pile-up

Generated jets, *hlt*120170

a) $40GeV > E_{t,ReconstructedJets} > 30GeV$, $40GeV > E_{t,GeneratedJets} > 30GeV$

b) $40GeV > E_{t,ReconstructedJets} > 30GeV$, $40GeV > E_{t,GeneratedJets} > 30GeV$

c) $E_{t,ReconstructedJets} > 30GeV$, $E_{t,GeneratedJets} > 30GeV$

Fig.5

Fig.6

a) $E_{t,ReconstructedJets} > 50GeV$, $E_{t,GeneratedJets} > 50GeV$

b) $E_{t,ReconstructedJets} > 40GeV$, $E_{t,GeneratedJets} > 40GeV$

c) $E_{t,ReconstructedJets} > 30GeV$, $E_{t,GeneratedJets} > 30GeV$

d) $E_{t,ReconstructedJets} > 20GeV$, $E_{t,GeneratedJets} > 20GeV$

a) $40GeV > E_{t,ReconstructedJets} > 30GeV$, $40GeV > E_{t,GeneratedJets} > 30GeV$

b) $40GeV > E_{t,ReconstructedJets} > 30GeV$, $40GeV > E_{t,GeneratedJets} > 30GeV$

c) $E_{t,ReconstructedJets} > 30GeV$, $E_{t,GeneratedJets} > 30GeV$

<u>Fig.7</u>